Science Advice for Ecosystem Approaches to Management

Europe (ICES)

- ECOSYSTEM APPROACH IN EUROPE
  - Policy Content
  - Implementation of Policies
- ICES ADVISORY & SCIENCE SUPPORT
  - Role of various Expert Groups
  - Where are the greatest holes
- VERY GENERAL (time)
  - Check International Council for Exploration of the Seas & European Marine Strategy websites for more
- Only one of several non-US sources-
  - FAO, UN-ICP, Australia, Canada, South Africa, etc.

Europe – Protected Species

- “Protected Species” is not as prominent in marine / anadromous issues as in N.A.
- EU “Species and Habitats” directive does give impetus and legal framework
- Slow uptake in aquatic systems
  - 2001 candidate list of “Threatened and declining species” for marine species got “lukewarm” ICES review, and few states have enacted any.
- Most activities in coastal & estuarine waters
- WG Fish Ecology picking it up

Europe – Ecosystem Approach

- This IS a big deal
  - Bergen Declaration 2001 – Ecosystem Approach with explicit Ecosystem Objectives – North Sea Ministers
- **Policy –** European Marine Strategy (2006)
  - common vision and general approach
  - specific approach at regional scale
  - holistic integrated approach
  - ecosystem approach to the management of human activities

STRATEGIC GOALS

- to protect, allow recovery and, ... restore the function and structure of marine **biodiversity and ecosystems** in order to achieve and maintain good ecological status of these ecosystems;
- to phase out pollution in the marine environment ...
- to contain the use of **marine services and goods** and other activities in marine areas to levels that are sustainable and that do not compromise uses and activities of future generations nor the capacity of marine ecosystems to respond to changes;
- to apply the principles of good governance, both within Europe and globally.

Implementation Plan

- Main Elements:
  - an assessment of the current status of the area and of the impact of human activities thereon;
  - a coherent set of specific environmental objectives and operational objectives to be achieved;
  - a programme of measures required to meet these objectives; and
  - a programme for monitoring and assessment.

Assessments – Basic Principles

- Where objectives, targets and benchmarks set for the protection and conservation of the marine environment are comparable, assessments should address them in a comparable way;
- different assessments covering (parts of) a sea region should be consistent for that region;
- assessments should be scientifically sound and aimed at the broadest level of acceptability possible in such a way that they can be used by other organisations;
- information on the marine environment should, to the fullest extent possible, be shared to facilitate the production of assessments.

Ecosystem Approach within E.U. Marine Strategy

- … application of the ecosystem approach to management of human activities in the European environment covers all relevant notions to start work at regional levels;
- the approach with objectives supported by indicators, limits, reference points and targets is the appropriate way forward;
- the introduction of fields of coherence is an important step in developing practical actions on the ecosystem approach;
- priority setting is essential ...
- the **guidance document** is an integral part of putting the European Marine Strategy into operation...

Guidance Document (ICES)

Definition of Ecosystem Approach”

- ‘a comprehensive **integrated** management of human activities based on best available scientific knowledge about the **ecosystem** and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity

Ecosystem Approach – Management Tools

- Input Controls
- Output Controls
- Spatial & Temporal Distribution Controls
- Integrated Planning Tools
- Economic Incentives
- Remediation Tools
- Communication Tools

(ALL require enabling policy instruments)

Steps in Applying Ecosystem Approach

- Scoping Current Situation:
  - Evaluate current ecosystem status
  - Evaluate current ecosystem policies
  - Inventory human activities
  - Evaluate social & economic policies
- Contrasting Current Situation with Vision
- Identify impt. Ecosystem Properties & Threats
- Setting Ecological Objectives
- Derive operational obj., indicators & ref. points
- Design ongoing management
- Periodic updates (With tests specified)

ICES – Expert Groups

- **WGECO** – Ecosystem Effects of Fishing (1990)
  - From fishing impacts to whole ecosystem approach
  - Develops conceptual & application frameworks
- WGRED – Short term applications (2004)
- REGNS (2003 for 06/7) & Baltic (2005 for 08/9)
  - analytical integrated assessments
- SGMAS–Frameworks for Mgmt. Strategies 2004
- Topic-specific “how-to” Expert Groups
  - WGPRISM – Envt variables in S-R computations
  - SGGROMAT – “ “ in growth & maturity

ICES – WGECO & ACE 2005

Chapter 3 – Advice needed to support European Marine Strategy –

- THREE related but not identical concepts
  - Integrated Management
  - Ecosystem Approach
  - Regional Delivery

Chapter 4 – Adding Ecosystem components to advice on fisheries management strategies (revised advisory framework)

Advice needed to support E.U.M.S.

- 13th Dialogue Meeting - Attention is given to “integration of advice” and “avoiding contradictions”, but so far the changes are to continue to provide sectoral advice, but with more factors being considered than in the traditional single-species (fisheries) or single-issue (environmental) advice.
- INTEGRATED MANAGEMENT HAS TWO MORE NEEDS:

WGECO – Chapter 3
Key Features of I.M. / E.A. / R.A.

- First, management decision-making for each human activity (not only takes an ecosystem approach within its sector, but it considers the impact of the options being considered for that activity on the options available for all the other sectors.
- Second, in applying the ecosystem approach within each sector, integrated management approaches require considering the likely effects of all other human activities in the sea on the ecosystem components intended to be conserved and/or used sustainably by the specific sector where the management decisions are being made.

Implications of Features

- Science advice provided to all clients must use common approaches, common language and terminology, and address the same range of ecological considerations.
- Science advice for each sector has to acknowledge to much greater degrees the social science and implementation aspects of the advice based primarily on physical and biological sciences.

Key Question – Science Advice for Integrated Management

- *If science advisors pursue advice for integrated management as simply a pooling of augmented sectoral advice, will the advice really be adequate to support integrated management?*
- At this point WGECO is uncertain if the answer to the question is “yes” or “no”, because current science advice is far from being fully “augmented” on a sector by sector basis. However it is important that we are not sure that the answer will be “yes”.

Requirements for “Augmented Sectoral Advice”

- All major sources of perturbation must be considered in decision-making about each activity being managed (Aggregate or “cumulative” effects)
- Challenges:
  - Progress towards objectives is result of aggregate impacts of all activities.
  - Paying customers aren’t interested
  - Much more diverse groups of experts needed to develop advice
  - Difference sectors have different targets & timetables.
  - (Missing concepts for integrating by “habitat”)
- LIKELY NEED INTEGRATED ASSESSMENTS

Regional Advisory Focus

- Component of E.M.S. & Ecosystem Approach + RACs
- Challenges:
  - Unequal availability of expertise
  - When and how to extrapolate data & models*
  - Dynamics of different ecosystem components determined at different scales*
    - Biology & physics “uncooperative” at any single scale
    - Risk of inconsistent objectives across boundaries
    - Inconsistent regulatory regimes across boundaries
- *Call for special SG for guidelines / rules

Chapter 4- Adding Ecosystem to Management Strategies

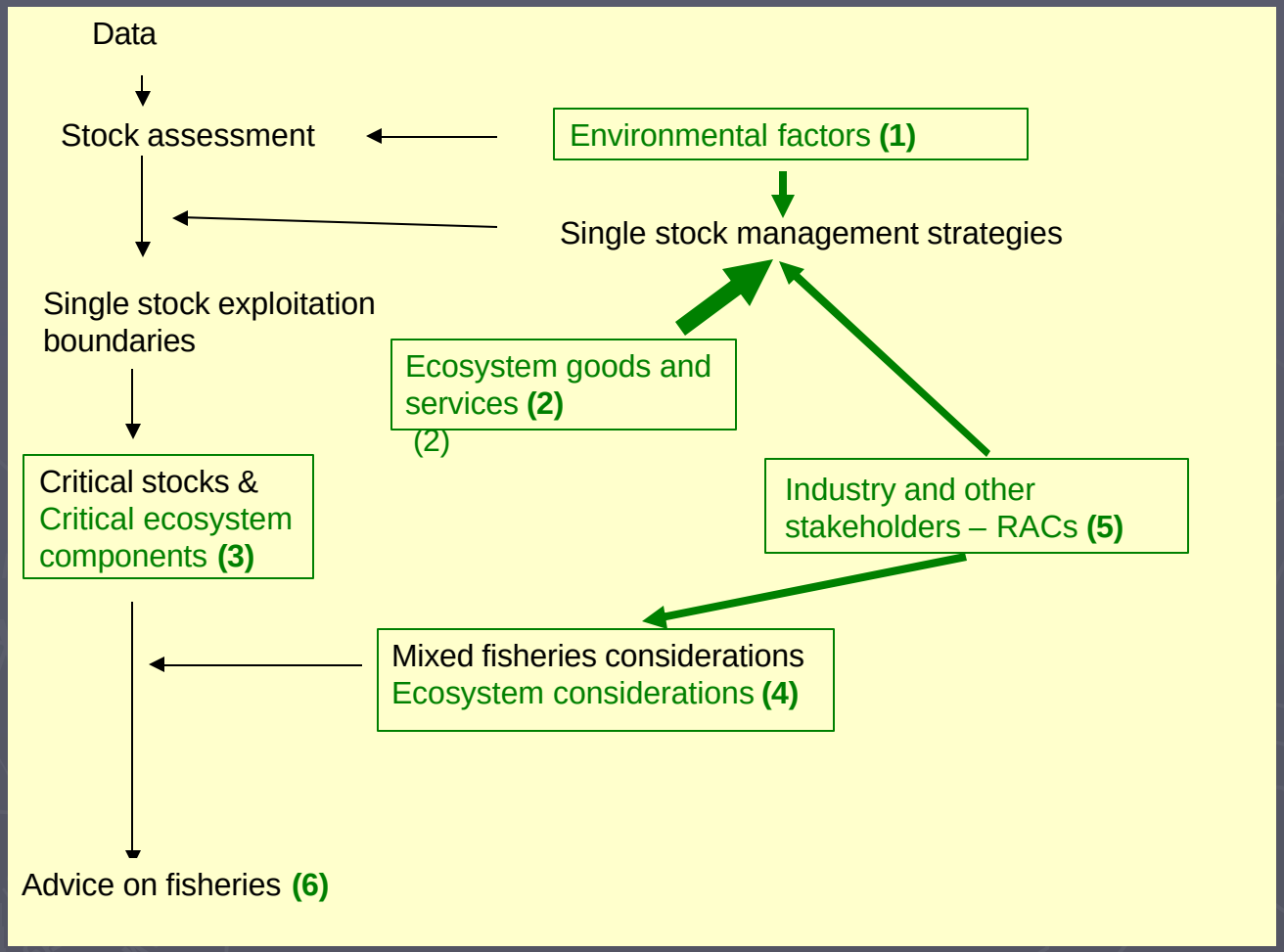
- A management strategy – in the terminology of ICES (SGMAS 2005) - includes
  - A decision (explicit or implicit) on longer term management objectives and performance criteria***
  - A decision on the relevant knowledge base for tactical management decisions ***
  - Tactical management decisions regarding the fisheries in the current or coming fishing season (including harvest control rules) **
  - A decision on implementation measures (mainly input or output control etc.) *
- ALL MAY HAVE ECOSYSTEM CONSIDERATIONS (* to ***)

Species Posing Special Challenges

- Stocks for which data series are short or only one state is known
- Target reference points for stocks where biological interactions are important
- Stocks where only low productivity has been seen.
- Cases where regime shifts may be apparent.
- Stocks where we are uncertain about present state or stock dynamics

ALL THESE MAY BE ECOSYSTEM ISSUES

ACFM/WGMAS FLOW CHART WITH WGECO ADDITIONS



What is added to WGMAS model

1. Need robustness in management rules, not just environment as an annual forcer of dynamics
2. Much broader definition of “ecosystem goods and services”
3. Needs of all critical ecosystem components, not just fish below B_{pa}
4. Rules for non-harvested components included in trade-offs, just like fleets
5. Necessary for multiple objective reconciliation
6. More measures discussed in advice

ADAPTIVE component of management strategy **ecosystem** advice

- FOUR ADAPTIVE MGMT ASSUMPTIONS MAY NOT BE VALID. Specifically:
- Even without precise quantification the necessary direction of change in consequences of the fishery must be obvious,
- Measures which will move the system in the necessary direction can identifiable readily.
- The stock and fishery performance are being monitored accurately enough that responses of the stock and fishery to changes in the management measures can be detected on time scales meaningful to management, and
- Changes detected in the stock and fishery can reasonably be attributed to the changes in the management plan.

WGRED – Ecosystem Intros.

- Working Group on Regional Ecosystem **Descriptions**
  - IS descriptive – Introduction to each Regional chapter of advice (~15 pages)
  - One for each region – identical section titles
    - Bathymetry, Physical Oceanography, Biological Oceanography, Benthos etc.
  - Sets context for advice that follows
  - HIGHLIGHTS MAJOR ENVIRONMENTAL FORCERS IN THE PAST YEAR+

WGRED – Guidance on Environmental Forcers for Assmts.

- Identify MAJOR environmental anomalies
- Point out where in assessment/projection effect will be seen (short-term effects)
  - Weight at age & maturation - Projections
  - Distribution, timing – “Special considerations”
  - Recruitment from SURVEYS, not models
- “Broker” of EU projects & Study Groups
  - Link findings to practice in specific assessments
  - Fix the low uptake of WGPRISM, WGGROMAT, etc
  - Implement EFIMAS, INEX-FISH, BECAUSE, etc results

REGIONAL INTEGRATED ASSESSMENTS

- North Sea (2006/7) and Baltic (~2008/09)
- Plan real QUANTITATIVE integration
  - Multiple trophic levels (primary to top preds)
  - Physics, chemistry & anthropogenic forcing
  - Link to human uses still in flux
- Considered EXPLORATORY and not intended as basis for management advice
- About three years to plan & conduct

Main Messages

- **Ecosystem Approach, Integrated Mgmt & Regional Focus EACH affect advice**
- Advisory frameworks from WGECO & ACE
  - (Thinking fairly mature; focus on the practical)
- Analytical integrated assessments – REGNS & SGIABS
  - (2006 is test year for North Sea)
- Move to management strategies already totally changes framework for fisheries advice
  - *** Have only acknowledged NEED for robustness to ecosystem forcing – not identified methods ***
- Descriptive part largely in hand (WGRED)
- **Lots or focused projects but little uptake in practice**